

Understanding the Intention to Trust Product Information and Certifications to Promote Sustainable Consumption: Applying the Theory of Planned Behavior

Djoko Sayogo
University of Muhammadiyah
Malang
dsayogo@ctg.albany.edu

Jing Zhang
Clark University
jizhang@clarku.edu

Sergio Picazo-Vela
Universidad de las Américas
Puebla
sergio.picazo@udlap.mx

Babak Bahaddin
University at Albany
bbahaddin@albany.edu

Luis Luna-Reyes
University at Albany
lluna-reyes@albany.edu

Abstract

This paper explores consumers trust in sustainable product and certification information included in the product's package and label by using Azjen's theory of planned behavior as a framework. We used 327 observations collected from an international survey distributed to students in the U.S., Mexico and Indonesia as proxy of consumers' view. Our results demonstrate that the consumer's general predisposition toward trust, social normative pressure, and the presence of factors that facilitate consumer's perceptions to perform trust behavior significantly increase the consumer's intention to trust sustainable product and certification information. Although we found some country variations in terms of the propensity to trust product information, the differences have no impact on the hypotheses of the theory of planned behavior. Our findings provide suggestive evidence of the instrumental roles of ICTs to facilitate sustainable development by enabling positive changes in consumer behavior, specifically in supporting sustainable consumption.

1. Introduction

Current market information asymmetries are responsible for the prevalence of consumption patterns that perpetuate the existence of negative externalities threatening sustainable economic trade and development [1], [2]. Pushing forward an agenda for sustainable consumption and development relies on the collective change in consumer's behavior [3]. Market information transparency is crucial in stimulating consumer's behavior to support sustainable development [4], and government interventions can be crucial for the establishment of market conditions that

are fair and competitive for products delivering social and environmental benefits. As argued by Dalal-Clayton & Bass, "in order to improve awareness, change attitudes and encourage action on sustainable development, various information products will be required" [5, p.236]. Consequently, information and communication technologies (ICTs) may be instrumental in facilitating and empowering consumer's behavior to support sustainable commerce.

Demand for transparency on product information has been slowly but steadily growing with the increase of consumer's concerns over product safety, health and sustainability [6]. Consumers are evermore anxious to have more information about product origin, production processes and their social and environmental impacts. Satisfying the consumers need for product attributes requires a smart disclosure of information generated from sharing information along the supply chain [7], [8]. The premise lies on the assumption that better informed consumers will make decisions that reflect their environmental and social values for sustainable products [9]–[11].

Growing awareness on product impacts as well as demand for more sustainable products have resulted in questionable industry practices to present products as environmental-friendly. Greenwashing, for example, generally befalls when a company devotes more time and money claiming green production through marketing than actually employing business practices that diminish environmental impact [12]. Greenwashing also occurs when a company selectively discloses positive information about their eco-friendly or social performance without fully revealing negative information [13]. In this way, greenwashing distorts consumers' confidence and trust in product information [14], negatively affecting consumer's trust in this market.

To overcome the distortion, open government and smart disclosure efforts that provide much needed product information might be instrumental in reinstalling consumers' trust and empowering sustainable consumption behaviors [15]. In this study, we explore how consumers' trust in sustainable product and certification information is affected by the transparency of product information. We use in this study Ajzen's [16] theory of planned behavior (TPB) as a framework to understand the determinants of consumer's intention to trust sustainable product and certification information. In particular, we are interested in testing whether their beliefs on the presence of factors that increase their knowledge on the functions and features of a product (behavioral control) facilitate their intentions to trust. In addition, we examine whether social normative pressure and consumer's motivation to fulfil the expectation of other (social pressure), and individuals' propensity toward trust influence consumers' intention to trust product and certification information. We focus only on the information and certifications related to sustainability and health. To test our TPB hypotheses, we applied multivariate regression on data collected from an international survey distributed to the students in the U.S., Mexico and Indonesia. The research is innovative in the application of the Theory of Planned behavior to the understanding of trust in information. Moreover, the international component constitutes a key contribution to enrich the literature on planned behavior.

Our results demonstrate that the consumer's general attitude toward trust, social normative pressure, and the presence of factors that facilitate consumer's perceptions to perform trust behavior significantly increase the consumer's intention to trust sustainable product and certification information. Our findings provide suggestive evidence of the instrumental roles of smart disclosure ICTs to facilitate sustainable development by fostering positive changes for individuals, specifically in supporting sustainable consumption.

This study is organized in five sections including the foregoing introduction. Section two presents the theoretical overview and the hypothesis development. We outline our methodology in section three. Finally, we present our results in section four, and discussion in sections five.

2. Literature review

Product information is systematically taken away in long supply chains, and consumers are presented simply with a final product and its final price [8]. The

advent of new technologies has facilitated information transparency using a diversity of models (e.g. face-to-face producer-to-consumer networks, voluntary certification organizations, and government-sanctioned certification regimes). More recently, technology has facilitated the creation of new applications, which are capable of delivering advantages that were not available before. These technology-enabled models include consumer-driven social computing systems such as barcoo.com, proprietary supply-chain-driven systems such as the Walmart sustainability index, and mobile technology-mediated ethical consumption tools (or MTEC) such as goodguide.com [8].

In the last years, research on value-based products has included consumer concerns related to social and environmental sustainability, in addition to other traditional variables such as consumer's needs and wants, habit, income level or hedonism, among others [17]. In this study, we try to contribute to the development of mechanisms that can possibly alter consumption toward more sustainable patterns in industrialized and developing countries [18], [19]. This study uses Ajzen's theory of planned behavior (TPB) as a framework to understand the main determinants of trust in sustainable acclaim included in labels of sustainable products.

2.1. Theory of planned behavior

The theory of Planned Behavior was first introduced by Icek Ajzen to provide a theoretical outline for simplifying the complexities of human social behavior [16].

Using this theory, behavioral intention can be predicted with a high degree of accuracy by three conceptually independent variables: attitude towards the behavior, subjective norm and perceived behavioral control [17]. The first two factors were initially studied in the Theory of Reasoned Action (TRA), in which the derivers of attitude (A) and subjective norms (SN) are a group of core attitudinal (bi) and normative beliefs (ni), respectively [20]. In other words, individual behaviors are a function of individuals' attitudinal beliefs, and the normative beliefs which are perceptions of what other people (important others) might think of the behavior [21]. Positive attitudes towards specific behaviors may turn into negative ones as a result of pressure and influence from important others [20]. In this sense, TPB defines attitude and social norm in terms of the following expressions,

$$A \propto \sum b_i \cdot e_i$$

$$SN \propto \sum n_i \cdot m_i$$

where e_i is the individual's subjective assessment of the desirability of the consequence, and m_i is the individual's incentive to comply with important others. In this sense, Subjective Norms (SN) are defined as a set of normative beliefs and their incentives to comply with important others in terms of such beliefs, and Attitude is constituted by a set of core beliefs and the desirability of their consequences from an individual's perspective.

TPB grew into the successor of the Theory of Reasoned Action (TRA) by introducing the Perceived Behavioral Control (PBC) as the third determinant of intention [16] and PBC thereafter has improved the accuracy of predictions of intentions [22]. Ajzen defined PBC as,

$$PBC \propto \sum c_i \cdot p_i$$

where c_i is a set of control beliefs and p_i is their perceived power. In this sense, Perceived Behavioral Control can be defined as an individual's beliefs on the control that he or she has over a specific behavior and his or her power to exercise such control.

2.2. Research model and hypotheses

TPB is a general model to explain most human behaviors [16]. In this study, we explore the main determinants of trust behaviors by examining the three major constructs of TPB. Uncertainties about product and vendor's attributes and behavior are among the many reasons of consumer's perception of risks in buying products [23]. Sustainable products, such as organic or fair-trade, have essentially Potemkin attributes, attributes that can be verified only through closed inspection of the process of production, that are especially susceptible to the lack of quality information on the side of consumers. The difficulties in verifying and controlling process claims that such products are produced and processed according to specific environmental, social, and economic standards give rise to conditions for fraud and opportunistic behaviors in such markets, a situation that calls for measures to provide quality assurance [15]. The assessment of Potemkin attributes, moreover, involves many uncertainties, and require consumer trust in the information or certificates that help consumers to verify these attributes.

Many typologies of trust have been proposed in literature [15], [24]. Although there is no single accepted definition, two themes appear consistently: vulnerability and positive expectation or optimistic belief [25]. Trust is seen as accepting the risks associated with the type and degree of interdependence inherent in a given relationship [26]. In the context of

our study, an individual will intend to trust product when that person believes that the providing company (a) makes a good-faith effort to act in accordance with any promises both explicit or implicit, (b) is honest in negotiations that led to such commitments, and (c) does not take excessive advantage of another even when the opportunity is available.

Figure 1 introduces our research model, which includes three independent variables and one control variable that recognizes the possible influence of cultural differences across countries.

Research in trust usually involves a general "disposition to trust" as a crucial predictor of trust behavior [27]–[29]. This general disposition to trust can be seen as a personality-related trait [30] that means that some individuals have higher propensity to trust while some others have lower propensity in similar situations, including the use of information [28]. This general disposition to trust is consistent with the General Attitude to Trust included in TPB. In this way, we pose our first hypothesis.

H1: Consumers general attitude toward trust will have a positive impact on consumers' intention to trust product information

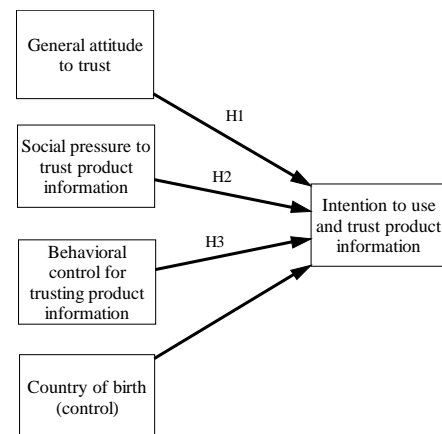


Figure 1. Preliminary model

Shared social norms, repetitive interactions, and shared experiences, are suggested by some scholars to facilitate the development of trust [28], [31]. Trust as a collective attribute, is applicable to the relations among people rather than to their individual psychological states [32]. Trust exists in a social system insofar as the members of that system act according to and are protected in the expected futures established by the presence of each other or their symbolic representations [33]. It is the mutual "faithfulness" [34] on which all social relationships ultimately rely [32]. Moreover, previous research also finds the influence of networks in the transference of trustworthiness and

reputation, increasing the probability of trusting intentions and behaviors [35]. Therefore, the basic relationship between social norms and intentions present in TPB is hypothesized as:

H2: Social pressure to trust product information has a positive impact on consumers intention to trust product information

Consumers are demanding traceable information, beyond of a simply logo or seal, that could allow them to know more about the process oriented attributes. Admitting the need for and benefits of trust, several studies have reflected on the insurance or protection of trust ([36]–[40]. The susceptibility of principals in circumstances of objective trust led Shapiro [38] to introduce guardians of trust: “a supporting social-control framework of procedural norms, organizational forms, and social-control specialists, which institutionalize distrust”. Guardians of trust raised the idea of trustees, assume the role of principals, acting on their behalf, to monitor agents [38]. Consumer’s ability in gaining additional information across the supply chain about the standards and processes associate with certifications help with deterring opportunistic behaviors of the sellers and giving consumers a sense of control. However, the role of additional information on trusting belief is inconclusive in previous studies. On one hand, the existence of additional information is important in increasing the knowledge base, which in turn influences the development of trusting belief [41]. On the other hand, one may not know what to do with the additional information in a world that is already overloaded with information and data [15]. Nevertheless, information encapsulated in simple and easy to be processed form might be conducive in removing barriers for understanding and trusting sustainable acclaim [42]–[44]. Therefore, we postulate:

H3: Behavioral control for trusting product information has a positive impact on consumers intention to trust product information

3. Research method

We conducted a survey to students enrolled in a private university in Mexico and Indonesia and a liberal arts university in the United States. Students were enrolled in the classes of three of the authors of the paper. In this sense, we used a convenience sample. To provide some context for the research, a decision-making assignment was distributed among all students before answering the survey. The survey instrument was

developed initially in English, and revised by a panel of experts. It was applied in English, Spanish, and Indonesian. The Spanish and Indonesian translation was translated back into English to verify the accuracy of the translation. Table 1 includes some demographics and other characteristics of the sample, such as self-consciousness about health and sustainability. Besides the three countries, respondents also include students with 12 other countries of origin.

Table 1. The sample distribution

		Categories	Proportion
Self-conscious about health		Very conscious	74%
		The borderline	22%
		Not very conscious	4%
Self-conscious about sustainability		Very conscious	48%
		The borderline	41%
		Not very conscious	11%
Sex		Female	48%
		Male	52%
Educational status		Undergraduate student	92%
		Graduate student	8%
Country of birth		United States	12%
		Mexico	27%
		Indonesia	50%
		Other countries	11%

3.2. Variables and measurement

Table 2 provides a summary of the constructs, their definitions and measurement, including key references to each of them.

Intention to use and trust product information [*intention*]. This variable measures the degree in which: a) consumers believe to trust that sustainable product labels include reliable and valid information, b) sustainable certification information depicting in product label reflects the disposition of certification to do something good and serve for the interests of consumers, and c) sustainable certification information depicting in product package and label reflects truthfulness, honesty and other integrity values. This is a composite variable consisting of eight items in which all are measured in 5-points Likert scale.

General attitude to trust [*attitude*]. This variable measures the tendency of respondents to trust information provided by sustainable certification scheme regardless of other reasons. It is a composite variable consisting of six items. Each of the sub-variable is measured in 5-points Likert scale.

Table 2. Construct definitions and items measured

Constructs	Definitions of this study	No. of items	References	ii-cor* / μ	α
Dependent Variable					
Intention to use and trust product information [<i>intention</i>]	Consumers believe that sustainable product labels a) include reliable and valid information, b) reflects the disposition of certification serve for the interests of consumers, and c) reflects integrity values.	8	Porter and Donthu [45]	0.268	0.86
Independent Variable					
General attitude to trust product information [<i>attitude</i>]	The tendency of respondents to trust information provided by sustainable certification scheme	6	Gefen [46]; Jiang, Jones and Javie [27]	0.268	0.76
Social pressure to trust product information [<i>pressure</i>]	The degree by which product labels and certifications recommended by friends and by family are important	2	Vermier & Verbeke [17]	0.436	0.71
Behavioral control for trusting product information [<i>control</i>]	The extent to which pictures from producers, maps showing product origin, or text describing adherence to sustainable and ethical practices on the product packaging	3	McKnight, Choudhury, and Kacmar [23]; Michaelidou & Hassan, [47]	0.327	0.76

* ii-cor refers to average of inter-item correlation

Social pressure to trust product information [*pressure*]. This variable implies the perception of individuals of the social normative pressure and motivation to comply with the expectations of other. In this study, we measure this variable as a composite variable of two items measuring the degree by which product labels and certifications recommended by friends and by family are important for the consumer's buying decisions.

Behavioral control for trusting product information [*control*]. This variable implies the individual beliefs of the presence of factors that facilitate their perceptions to perform trust behavior. For this study, we measure this variable as the extent to which pictures from producers or maps showing product origin or text describing adherence to sustainable and ethical practices on the product packaging could facilitate the consumers in making buying decisions. This is a composite variable consisting of three items in which all are measured in 5-points Likert scale.

As showed in Table 2, the Chronbach's alpha value of all variables in our research model is above the generally accepted threshold of 0.7 indicating good reliabilities.

4. Analysis and results

This section presents the results of our analysis, including bivariate analysis, mean differences of the main constructs across countries, and regression analysis to test our hypotheses of the influence on consumers' intention to trust product information.

4.1 Bivariate analysis

The pairwise correlation matrix presented in Table 3 merits analytical attention before we analyze the regression results. Table 3 indicates that the social pressure (0.417), general attitude to trust (0.463) and behavior control (0.417) all have positive and significant correlation to the intention of customers to trust and use product information. On the other hand, correlation does not imply causal relationships. To test whether this independent significant relationship of each factor persists when considering the combined effect of all factors and their respective unique variance, we run robust multivariate regression analysis to mitigate the issue of heteroscedasticity. Of note, all of the correlation coefficients of the determinants to the intention to use and trust are moderate and the correlation coefficient between the determinants are weak. This signifies the non-possibilities of perfect correlation or multicollinearity that could lead to bias or make the regression results inefficient.

4.2 The influence of cultural and national context difference

Given that our data was based on the survey that was distributed in the US, Mexico, and Indonesia, we discuss the possible impact of different cultural and national context in affecting the relationships between the consumer's intention to trust and use product information. We analyze the impact of cultural differences twice: a) using two sample test (Table 4) and b) using multivariate regression analysis with country as control variable.

Table 3. Pairwise correlation

	Intention to Trust	General Attitude	Social Pressure	Behavior Control
Intention to Trust	1.0000			
General Attitude	0.4629	1.0000		
Social Pressure	0.4172	0.3396	1.0000	
Behavioral Control	0.4173	0.3075	0.3172	1.0000

Note: all correlation coefficients are significant at 0.05 level

Table 4. Two-sample test with equal variances

Variable	Mean (μ)		t_{value}	Mean (μ)		t_{value}	Mean (μ)		t_{value}
	Indo	Other		Mexico	Other		USA	Other	
Intention to Trust	.346	-.337	3.087	-.649	.249	3.66	.371	-.052	1.24
General Attitude	.635	-.608	7.30	-.839	.333	6.07	-.184	.026	0.74
Social Pressure	.110	-.106	1.577	-.122	.048	1.11	.027	-.003	0.14
Behavior Control	-.389	.375	5.03	.508	-.199	4.14	.146	-.020	0.69

Comparing the mean of intention to use and trust product information, we found significant difference between Indonesia and Mexico as compared to other countries with t -value 3.087 and 3.66 respectively. The results suggest that the variability of intention to use and trust product information for Indonesian and Mexican customers differ from the variability of intention to use and trust product information for the customers in USA and the 12 other countries of our sample. Similar pattern is identified for variables general attitude to trust and behavioral control. The results show significant difference in general attitude to trust and behavioral control when comparing the respondents from Indonesia and Mexico against USA and 12 other countries. The results also suggest that the variability of social pressure for Indonesia, Mexico and USA customers is not significantly different as compared to the 12 other countries costumers. Interestingly, the results show that there is no significant difference in the variability of all variables when comparing between USA customers and the rest of the countries customers. These findings provide suggestive evidence of the influence of cultural and national context to some of the determinants and the intention to use and trust product information. On the other hand, two sample t -test measures the mean differences in variable independent of one another without considering the possible inter-variable relationships. To understand the causality between the determinants and intention to trust information as well as the influence of cultural and national contexts, we run multivariable regression analysis.

4.2 Determining intention to use and trust product information

The results indicate a positive and significant relationship between the three determinants (social pressures, behavioral control, and general attitude to trust) and the intention to use and trust product information. We also tested the influence of interactive terms, interacting the variables with regional variables. However, the results of the interactions were not significant and did not change either the estimate coefficients or the standards errors. Thus, table 5 present the model without interactive variables.

The goodness-of-fit model (R^2) for the first model is 0.343 meaning that the model explains 34.3% the variability of the response data around its mean. The low R^2 value in social sciences is not unexpected given that the attitude of human subject is hard to predict.

We found positive, significant and direct relationship between the behavioral control in trusting information and the intention to use and trust product information with coefficient estimate of 0.4115. This indicates that one standard deviation increase in the consumer's beliefs of the presence of factors that facilitate their perceptions to perform trust behavior will increase their intention to use and trust product information by 0.41. The influence of consumer's general attitude on the intention to use and trust is positive and significant with coefficient estimate of 0.373. This result thus indicates that the consumer's intention to use and trust product information will increase by 0.373 if the consumer's tendency of trust belief increase by one standard deviation. Similarly, social pressure positively and significantly influence intention to use and trust with coefficient estimates of 0.378. As such, consumer's intention to use and trust product information will increase by 0.378 given one standard deviation increase in the consumer's perceptions of the social pressure to comply with the expectations of others. When compared using the

standardized coefficient, the influence of general attitude to trust information is more dominant than the other two determinants (beta coefficient of 0.308).

While the influence of both behavioral control and social pressure is almost comparable with beta coefficient of 0.234 and 0.247 respectively.

Table 5. Regression results

Predictors	No Regional Differences			Regional Differences		
	Coef.	t	Beta	Coef.	t	Beta
General attitude to trust	0.3730	6.18	0.3070	0.3720	5.84	0.3062
Social pressure	0.3788	4.06	0.2475	0.3964	4.43	0.2384
Behavioral control for trusting information	0.4115	4.56	0.2344	0.3829	4.09	0.2370
Indonesia				-0.0945	-0.36	-0.0234
Mexico				-0.1840	-0.62	-0.0408
USA				0.2239	0.72	0.0365
N			324			324
F(3, 320)			45.68			24.67
R ²			0.343			0.346

In the second model, we measure the impact of regional differences by adding dummy variables depicting the three countries to the model. The result indicates that the regional difference is not significant in predicting the differences of intention to use and trust information across the three countries as compared to the rest of the 12 other countries of the respondents. Thus, we found no significant differences when comparing the three countries of interest with the rest of the 12 countries of the respondents in this study.

5. Discussion & concluding remarks

In this study, we applied the theory of planned behavior to evaluate the determinants of consumer's intention to use and trust sustainable product and certification information. In summary, we found that the three determinants of intention to use and trust information – general attitude to trust information, social pressure, and behavioral control – are all significantly and positively influencing consumer's intention to use and trust product information. The general attitude or disposition of individual to trust information is a personality-related trait, meaning some individuals have higher disposition to trust while some others have lower [28], which we presume is not easy to alter or intervene. On the other hand, the other two determinants – social pressure and behavioral control – can be altered and intervened by the provision of tools and information that could potentially increase the likelihood of individual to trust product information to support sustainable consumption as we explicate in the following sections.

5.1. The significance of information provision to consumer's intention to use and trust product information

The findings suggest that the presence of factors that could facilitate consumer's perceptions to perform their trust behavior significantly and positively influence their intention to use and trust product information. Availability of tools could provide control to the individual in performing trust behavior [16]. As such, our findings augment this argument by pointing out that the availability of information could facilitate the development of consumer's intention to use and trust. Our findings provide evidence to the argument that information systems and information are at the heart of a framework to support sustainable development and to create a sustainable society [48]. We confirmed that part of the challenge in creating a sustainable society is overcoming the lack of information or information processing capability of individuals to empower consumers' pursuit toward sustainable consumption [4], [48]. We further reinforce the contention that altering the consumer's choices architecture through smart disclosure of information could help consumers making better decision [11] including in sustainable consumption [49], [50], [7]. We provide suggestive evidence that presentation of information and provision of tools to help consumers apprehend the meaning and consequences of their consumption decision will influence the consumers' trust on product information. Our findings may suggest that pictures from producers or maps showing product origin or text describing adherence to sustainable and ethical practices on the product packaging may influence the consumer's intention to use and trust sustainable product and certification information. Studies demonstrate that packaging has great potential

to contribute to sustainable development through its functions [51] and information on the product's sustainability characteristics affect the consumer's willingness to buy sustainable products [52]. Given the finding, our results provide suggestive evidence of the importance of information presentation and tools to facilitate consumer's trusting intention which could potentially lead to sustainable consumption. Likewise, future research is needed to ascertain whether intention to use and trust product information significantly lead to consumers actually buying the sustainably certified products.

Previous studies argue that the influence of disposition/propensity to trust to the intention to trust is mediated by the quality of information [53]. Our findings enrich the discussion by providing evidence that the availability of tools to augmenting the quality of information provide control to the individual in performing trust behavior. Thus, not only the quality of information matters, but also are tools to facilitate the understanding of the information crucial in mediating the impact of disposition/propensity to trust to the individual's intention to use and trust product information.

5.2. The significance of social normative pressure to consumer's intention to use and trust product information

The results also show that consumer's perception of the importance of social normative pressure and the consumer's motivation to comply with the expectations of others significantly influence their intention to use and trust sustainable product and certification information. These findings thus further support the conception of creating a supportive framework for collective force to push forward the agenda of sustainable consumption through the development of "ecological citizenship" [3]. It is widely acknowledged that expression through consumer behavior could be a powerful motivating force for sustainable consumption. However, it is not reasonable to exhort the effort to individuals, thus it is necessary to create the ecological citizenship [1], [3]. Likewise, studies found that social pressure from peers significantly predict the consumer's intention to buy sustainable products [17]. As such, our findings provide evidence that education program, grass root community development, social computing tools that raise and spread the awareness of the connection between consumption and sustainability can be effective in creating ecological citizenship among peers, family, and spouses.

5.3. Country's difference on consumer's intention to use and trust product information

Research found that socio-economic, infrastructure, and cultural context have significant influence on

sustainable consumption [54]. The macro factors such as food culture and political culture are increasingly crucial in predicting the sustainability of food consumption [54], [55]. Although extant studies highlight the importance of cultural and national context in shaping the individual variables, our results indicate that there are no significant differences in the consumer's intention to use and trust sustainable product and certification information depicting in product package and label. When comparing among Indonesia, Mexico, United States, and the rest of the 12 countries of the respondents, we found no significant difference. This contrasting finding is intriguing given that previous studies found significant influence of cultural and national contexts to the consumer consumption of sustainable product. It is plausible to argue that while the social and cultural context influenced and constrained individual choice for consuming sustainable products [56], individual intention to use and trust sustainably certified product information is more generalizable. This finding further accentuates an important future research to ascertain the connection between consumer's intentions to use and trust product information to their propensity to consume sustainable products. On the other hand, our measure of cultural and national context in this study is only based on the nationality measured using dummy variable. As argued by Cohen [55], Seyfang [3] and others, there are various complex variables defining cultural and national contexts, such as: political culture, policy styles, food culture, and many other. Future research could further evaluate the influence of cultural and national contexts using more complex measurements.

5.4. Concluding remarks

The research presented in this paper shows yet another domain where the Theory of Planned Behavior demonstrates its explanatory power. Moreover, the application of the theory leads to important insights that can potentially improve practices in promoting sustainable consumption. Improving product transparency by disclosing product information smartly through the facilitation of information and communication technologies (ICTs) is argued to support consumers making better purchasing decisions that reflect their environmental and social values. Given the premise, we explore the determinants of consumer's intention to use and trust sustainable product and certification information depicting in product package and label. The findings indicate that the consumer's general attitude toward trust, the consumer's motivation to fulfil the expectation of other (social pressure), and the consumer's beliefs of the presence of factors that facilitate their perceptions to perform trust behavior (behavioral control)

significantly increase the consumer's intention to use and trust that sustainable product and certification information on product package and label demonstrates reliable and valid information, reflects the disposition of certification to do something good and serve for the interests of consumers, and reflects truthfulness, honesty and upholds other integrity values. While it is more difficult to control the disposition to trust, our results point to the opportunities of providing information and tools to help consumers trusting product information. The findings thus provide suggestive evidence of the importance of information and information technologies in supporting sustainable consumption. We particularly believe that the use of blockchain technologies may provide a more trusted way of sharing information along the supply chain.

Future research will involve more detailed explorations of the data to further understand the impacts of cultural differences across countries. In the current version we did not yet consider the multidimensionality of the variables. We are planning to use the country variable to test interacting effects with the three main independent variables in the TPB. We perform Harman's single factor test to ensure that the variations in the responses are caused by the actual predispositions of the respondents, thus minimize the common method bias. However, we acknowledge that the current research might involve the problem of common method bias due to the use of self-reported intention to use and trust.

6. References

- [1] G. Seyfang, "Shopping for Sustainability: Can Sustainable Consumption Promote Ecological Citizenship?," *Environ. Polit.*, vol. 14, no. 2, pp. 290–306, Apr. 2005.
- [2] J. Zhang, L. F. Luna-Reyes, and T. A. Pardo, "Information, Models, and Sustainability: Policy Informatics in the Age of Big Data and Open Government," in *Information, Models, and Sustainability*, J. Zhang, L. F. Luna-Reyes, T. A. Pardo, and Djoko S. Sayogo, Eds. Springer, 2016.
- [3] G. Seyfang, "Sustainable consumption, the new economics and community currencies: Developing new institutions for environmental governance," *Reg. Stud.*, vol. 40, no. 7, pp. 781–791, Oct. 2006.
- [4] C. Fuchs, "The implications of new information and communication technologies for sustainability," *Environ. Dev. Sustain.*, vol. 10, no. 3, pp. 291–309, Jul. 2006.
- [5] D. B. Dalal-Clayton and S. Bass, *Sustainable development strategies: a reference book*. Earthscan Publications: London, UK, 2002.
- [6] E. Dimara and D. Skuras, "Consumer demand for informative labeling of quality food and drink products: a European Union case study," *J. Consum. Mark.*, vol. 22, no. 2, pp. 90–100, Mar. 2005.
- [7] H. Jarman and L. F. Luna-Reyes, *Private Data and Public Value: Governance, Green Consumption, and Sustainable Supply Chains*. Springer, 2016.
- [8] L. F. Luna-Reyes, J. Zhang, A. Whitmore, H. Jarman, S. Picazo-Vela, D. L. Andersen, G. K. Tayi, T. A. Pardo, D. S. Sayogo, J. S. Luciano, and others, "Full information product pricing: An information strategy for harnessing consumer choice to create a more sustainable world," *Commun. Assoc. Inf. Syst.*, vol. 34, p. 32, 2014.
- [9] L. F. Luna-Reyes, D. F. Andersen, D. L. Andersen, D. Derrick, and H. Jarman, "Full information product pricing regimes: Policy implications for US-Mexico sustainable commerce," in *Puentes Symposium, Houston, TX*, 2012.
- [10] C. R. Sunstein, "Informing consumers through smart disclosure," White House, Washington DC, 2011.
- [11] R. Thaler and C. Sunstein, "Nudge: The gentle power of choice architecture," *N. Hav. Conn. Yale*, 2008.
- [12] L. Lambertini, G. Pignataro, and A. Tampieri, "Green Consumers, Greenwashing and the Misperception of Environmental Quality," Rochester, NY, 04-Aug-2014.
- [13] T. P. Lyon and J. W. Maxwell, "Greenwash: Corporate Environmental Disclosure under Threat of Audit," *J. Econ. Manag. Strategy*, vol. 20, no. 1, pp. 3–41, Mar. 2011.
- [14] R. Hamann and P. Kapelus, "Corporate Social Responsibility in Mining in Southern Africa: Fair accountability or just greenwash?," *Development*, vol. 47, no. 3, pp. 85–92, Sep. 2004.
- [15] J. Zhang, H. Liu, D. S. Sayogo, S. Picazo-Vela, and L. Luna-Reyes, "Strengthening institutional-based trust for sustainable consumption: Lessons for smart disclosure," *Gov. Inf. Q.*, In Press.
- [16] I. Ajzen, "The theory of planned behavior," *Organ. Behav. Hum. Decis. Process.*, vol. 50, no. 2, pp. 179–211, Dec. 1991.
- [17] I. Vermeir and W. Verbeke, "Sustainable Food Consumption: Exploring the Consumer 'Attitude – Behavioral Intention' Gap," *J. Agric. Environ. Ethics*, vol. 19, no. 2, pp. 169–194, Apr. 2006.
- [18] OECD, "Sustainable consumption and production," OECD, Paris, 1997.
- [19] J. Thøgersen and F. Ölander, "Human values and the emergence of a sustainable consumption pattern: A panel study," *J. Econ. Psychol.*, vol. 23, no. 5, pp. 605–630, Oct. 2002.
- [20] M. Fishbein and I. Ajzen, "Belief, attitudes, intention, and behavior," *Introd. Theory Res. Massachussets Addison-Wesley*, 1975.
- [21] P. A. Pavlou and M. Fygenson, "Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior," *MIS Q.*, vol. 30, no. 1, pp. 115–143, 2006.
- [22] I. Ajzen and T. J. Madden, "Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control," *J. Exp. Soc. Psychol.*, vol. 22, no. 5, pp. 453–474, Sep. 1986.
- [23] D. H. McKnight, V. Choudhury, and C. Kacmar, "The impact of initial consumer trust on intentions to transact

- with a web site: a trust building model," *J. Strateg. Inf. Syst.*, vol. 11, no. 3–4, pp. 297–323, Dec. 2002.
- [24] S. Castaldo, *Trust in Market Relationships*. Edward Elgar Publishing, 2007.
- [25] D. M. Rousseau, S. B. Sitkin, R. S. Burt, and C. Camerer, "Not So Different After All: A Cross-Discipline View Of Trust," *Acad. Manage. Rev.*, vol. 23, no. 3, pp. 393–404, Jul. 1998.
- [26] B. H. Sheppard and D. M. Sherman, "The Grammars of Trust: A Model and General Implications," *Acad. Manage. Rev.*, vol. 23, no. 3, pp. 422–437, Jul. 1998.
- [27] P. Jiang, D. B. Jones, and S. Javie, "How third-party certification programs relate to consumer trust in online transactions: An exploratory study," *Psychol. Mark.*, vol. 25, no. 9, pp. 839–858, Sep. 2008.
- [28] R. C. Mayer, J. H. Davis, and F. D. Schoorman, "An Integrative Model Of Organizational Trust," *Acad. Manage. Rev.*, vol. 20, no. 3, pp. 709–734, Jul. 1995.
- [29] D. H. McKnight, L. L. Cummings, and N. L. Chervany, "Initial Trust Formation in New Organizational Relationships," *Acad. Manage. Rev.*, vol. 23, no. 3, pp. 473–490, Jul. 1998.
- [30] D. Gefen, E. Karahanna, and D. W. Straub, "Trust and TAM in Online Shopping: An Integrated Model," *MIS Q.*, vol. 27, no. 1, pp. 51–90, Mar. 2003.
- [31] J. L. Bradach and R. G. Eccles, "Markets versus hierarchies: from ideal types to plural forms," *Annu. Rev. Sociol.*, vol. 15, no. 1, pp. 97–118, 1989.
- [32] J. D. Lewis and A. Weigert, "Trust as a Social Reality," *Soc. Forces*, vol. 63, no. 4, pp. 967–985, Jun. 1985.
- [33] B. Barber, *Informed consent in medical therapy and research*. New Brunswick, NJ: Rutgers University Press, 1980.
- [34] G. Simmel, "The philosophy of money, trans. Tom Bottomore and David Frisby," *Lond. Routledge Kegan Paul*, vol. 236, p. 232, 1978.
- [35] S.-S. Wong and W. F. Boh, "Leveraging the Ties of Others to Build a Reputation for Trustworthiness Among Peers," *Acad. Manage. J.*, vol. 53, no. 1, pp. 129–148, Feb. 2010.
- [36] D. Gambetta, *Trust: Making and Breaking Cooperative Relations*. Blackwell, 1988.
- [37] C. Lane and R. Bachmann, *Trust Within and Between Organizations: Conceptual Issues and Empirical Applications*. Oxford University Press, 1998.
- [38] S. P. Shapiro, "The Social Control of Impersonal Trust," *Am. J. Sociol.*, vol. 93, no. 3, pp. 623–658, 1987.
- [39] T. R. Tyler and R. M. Kramer, "Whither Trust," in *Trust in Organizations: Frontiers of Theory and Research*, R. M. Kramer and T. R. Tyler, Eds. SAGE Publications, 1995.
- [40] L. G. Zucker, "Production of trust: Institutional sources of economic structure, 1840–1920," *Res. Organ. Behav.*, vol. 8, pp. 53–111, 1986.
- [41] X. Li, T. J. Hess, and J. S. Valacich, "Why do we trust new technology? A study of initial trust formation with organizational information systems," *J. Strateg. Inf. Syst.*, vol. 17, no. 1, pp. 39–71, Mar. 2008.
- [42] M. R. Gleim, J. S. Smith, D. Andrews, and J. J. Cronin Jr., "Against the Green: A Multi-method Examination of the Barriers to Green Consumption," *J. Retail.*, vol. 89, no. 1, pp. 44–61, Mar. 2013.
- [43] L. Marian and J. Thøgersen, "Direct and mediated impacts of product and process characteristics on consumers' choice of organic vs. conventional chicken," *Food Qual. Prefer.*, vol. 29, no. 2, pp. 106–112, Sep. 2013.
- [44] J. Thøgersen and U. Schrader, "From Knowledge to Action—New Paths Towards Sustainable Consumption," *J. Consum. Policy*, vol. 35, no. 1, pp. 1–5, Feb. 2012.
- [45] C. E. Porter and N. Donthu, "Cultivating Trust and Harvesting Value in Virtual Communities," *Manag. Sci.*, vol. 54, no. 1, pp. 113–128, Jan. 2008.
- [46] D. Gefen, "E-commerce: the role of familiarity and trust," *Omega*, vol. 28, no. 6, pp. 725–737, Dec. 2000.
- [47] N. Michaelidou and L. M. Hassan, "Modeling the factors affecting rural consumers' purchase of organic and free-range produce: A case study of consumers' from the Island of Arran in Scotland, UK," *Food Policy*, vol. 35, no. 2, pp. 130–139, Apr. 2010.
- [48] R. T. Watson, M.-C. Boudreau, and A. J. Chen, "Information Systems and Environmentally Sustainable Development: Energy Informatics and New Directions for the IS Community," *MIS Q.*, vol. 34, no. 1, pp. 23–38, 2010.
- [49] D. S. Sayogo, J. Zhang, L. Luna-Reyes, H. Jarman, G. Tayi, D. L. Andersen, T. A. Pardo, and D. F. Andersen, "Challenges and requirements for developing data architecture supporting integration of sustainable supply chains," *Inf. Technol. Manag.*, vol. 16, no. 1, pp. 5–18, Dec. 2014.
- [50] J. Zhang, H. Liu, D. S. Sayogo, S. Picazo-Vela, and L. Luna-Reyes, "Strengthening institutional-based trust for sustainable consumption: Lessons for smart disclosure," *Gov. Inf. Q.*, In Press.
- [51] H. Lindh, "Sustainable Packaging of Organic Food: Myth or Reality?," Lund University, 2016.
- [52] S. Spendrup, E. Hunter, and E. Isgren, "Exploring the relationship between nature sounds, connectedness to nature, mood and willingness to buy sustainable food: A retail field experiment," *Appetite*, vol. 100, pp. 133–141, May 2016.
- [53] H. Gill, K. Boies, J. E. Finegan, and J. McNally, "Antecedents Of Trust: Establishing A Boundary Condition For The Relation Between Propensity To Trust And Intention To Trust," *J. Bus. Psychol.*, vol. 19, no. 3, pp. 287–302, Apr. 2005.
- [54] J. Thøgersen, "Country Differences in Sustainable Consumption: The Case of Organic Food," *J. Macromarketing*, vol. 30, no. 2, pp. 171–185, Jun. 2010.
- [55] M. Cohen, "Sustainable consumption in national context: an introduction to the symposium," *Sustain. Sci. Pract. Policy*, vol. 1, no. 1, 2005.
- [56] T. Jackson, "Live Better by Consuming Less?: Is There a 'Double Dividend' in Sustainable Consumption?," *J. Ind. Ecol.*, vol. 9, no. 1–2, pp. 19–36, Jan. 2005.